

Appl. No. 09/989,528
Amdt. Dated August 20, 2003
Reply to Office action of May 21, 2003
Attorney Docket No. P13481-US1
EUS/J/P/03-8886

REMARKS/ARGUMENTS

Claims 1-28 are pending in the application. Favorable reconsideration of the application is respectfully requested in view of the following remarks.

Examiner Objections

Applicant notes with appreciation the Examiner's acknowledgment of Applicant's Claims 18, 19, and 24-26 as being allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claim Rejections – 35 U.S.C. § 103 (a)

Claims 1-4, 6-9, 11-13, 15-17, 20-23, and 27-28 are rejected under 35. U.S.C § 103(a) as being unpatentable over U. S. Patent 6,225,874 to Kerley et al. (Kerley) in view of the UK patent 801,062 issued to Nicholls (Nicholls). The Applicant respectfully traverses this rejection and submits that Kerley in view of Nicholls does not disclose (directly or inherently) at least the following features present in Claim 1 (similar features can be found in independent Claims 17 and 28: an unequal power splitter providing a low loss path and a high loss path.

The Applicant respectfully directs the Examiner's attention to Claim 1:

1. (Original) An R.F. antenna switch for coupling either a high-loss port or a low-loss port to a common port, comprising:
an unequal power splitter with
the common port, the high-loss port and the low-loss port,
a high-loss path coupled between the common port and the high-loss port, and
a low-loss path coupled between the common port and the low-loss port;
a switching element having
an input coupled to the low-loss port, and
an output; and

Appl. No. 09/989,528
Amdt. Dated August 20, 2003
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Attorney Docket No. P13481-US1
EUS/J/P/03-8896

a first terminating element coupled to the output of the switching element, wherein the low-loss port is terminated with a characteristic impedance of the unequal power splitter when the switching element is switched on.
(emphasis added)

The Applicant respectfully submits that neither Kerley nor Nicholls nor a combination of Kerley and Nicholls teach or suggest an unequal power splitter comprising a high loss and a low loss path.

The Kerley reference requires a shunt switch on each output port (OUT1 and OUT2). This is due to the fact that a coupling factor of 3 dB has been chosen for an equal power split. Furthermore, this type of coupler has to have an AC-Ground connected to the unused port C (Figure 2). In contrast the present invention is less complex since it doesn't require another switching element in the high-loss path due to the unequal power split (substantially higher, e.g. 14 dB).

As noted in the Office action, the AC switch depicted in Fig. 3 of Kerley, transmission lines 310 and 316 and transmission lines 312 and 314 define a low-loss primary line and a high-loss coupled line, respectively of a directional coupler. Referring to Kerley (Col. 4, Line 58), it was noted that the coupling between the primary and coupled lines has a coupling factor of 8.34 dB. Since equal power splitting occurs at a coupling of 3 dB, the conclusion is that the energy in the coupled line is reduced compared with the energy in the primary line, resulting in a high-loss path.

An AC switch shown in Fig. 3 actually consists of two cascaded couplers, each having a coupling factor of nominally 8.34 dB. However, the overall coupling factor of the entire structure is nominally 3 dB (Col. 4, lines 59-60). That is with PIN diodes 318 and 320 in the embodiment depicted in Fig. 3 in an off state, equal amounts of energy appear at output ports OUT1 and OUT2. That is, in a 3 dB coupler, both the primary line and the coupled line are equal-loss lines and neither can be interpreted as a high-loss or low-loss line. Therefore, with no high-loss line and no low-loss line, the AC switch of Fig. 3 in Kerley is not an unequal power splitter; it is an equal power splitter. Kerley fails

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Attorney Docket No. P13481-US1
EUS/J/P/03-8886

to teach or suggest an unequal power splitter providing a low-loss path and high-loss path. Therefore, the present invention is patentable over the Kerley reference.

The Nicholls reference is cited to provide a matching impedance termination element. Nicholls discloses a "second matching impedance 10" that is used to terminate respective line(s) with an impedance equal to the modulus of the characteristic impedance of said transmission lines during transition phase only. An impedance equal to the modulus of the characteristic impedance, temporarily connected in parallel to impedance 5, may be able to minimize reflections and hence limit abrupt change in signal level, but it will not be possible to eliminate reflections totally.

In contrast to Nicholls, the present invention assumes a low-loss path termination equal to the characteristic impedance whenever the low-loss path is deactivated and the high-loss path is active. Terminations equal to the characteristic impedance will eliminate reflections totally. Nicholls does not teach or suggest an unequal power splitter providing a low-loss path and high-loss path. Therefore, Claim 1 of the present invention is patentable over Kerley and Nicholls and a combination of Kerley and Nicholls.

As between Claim 1 and the Kerley and Nicholls references, the Applicant submits that independent Claims 17 and 28 contain limitations analogous to those found in Claim 1. For the above given reasons the Applicant respectfully submits that Claims 17 and 28 are patentable over the Kerley and Nicholls references.

Claims 2-4, 6-9, 11-13 and 15-16 depend from Claim 1 and contain the same novel limitations as Claim 1. Claims 20-23 and 27 depend from Claim 17 and also contain the same novel limitations as Claim 17. Therefore, Claims 2-4, 6-9, 11-13, 15-16, 20-23, and 27 are also patentable over Kerley and Nicholls.

Claims 5, 10 and 14 are rejected under 35. U.S.C § 103(a) as being unpatentable over U. S. Patent 6,225,874 to Kerley et al. (Kerley) in view of the US Patent issued to Goldman et al. (Goldman). The Applicant respectfully traverses the rejection.

Claims 5, 10 and 14 depend from independent Claim 1 and contain the same unique and novel limitations. Therefore, Claims 5, 10 and 14 are patentable over the

Appl. No. 09/989,528
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EUS/J/P/03-8886

Kerley reference. Goldman is cited for disclosing a microwave coupler circuit for adding a terminating resistor to the isolated port of the coupled line and adding low pass filters to the DC circuits. This combination is cited for preventing undesired signal reflections into the switch. However Goldman does not teach or suggest an unequal power splitter providing a low-loss path and high-loss path. Claim 1 of the present invention, and therefore Claims 5, 10 and 14 are also patentable over Kerley and Goldman and a combination of Kerley and Goldman.

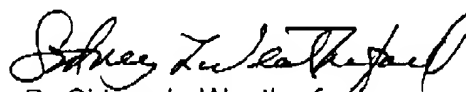
Appl. No. 09/989,528
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Attorney Docket No. P13481-US1
EUS/J/P/03-8886

CONCLUSION

In view of the foregoing remarks, the Applicants believe all of the claims currently pending in the Application to be in a condition for allowance. The Applicant, therefore, respectfully requests that the Examiner withdraw all rejections and issue a Notice of Allowance for Claims 1-28.

The Applicants request a telephonic interview if the Examiner has any questions or requires any additional information that would further or expedite the prosecution of the Application.

Respectfully submitted,



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